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Franklin, Benjamin

An account of the new invented Pennsylvanian fire-places

An Account of the New Invented
PENNSYLVANIAN FIRE-PLACES

BY
Benjamin Franklin

PROVIDENCE
The Associates of the John Carter Brown Library
1974

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This reprint of *An Account of the New Invented Pennsylvanian Fire-Places* was first printed for G. K. Hall & Company to be distributed as their Christmas Greeting for 1973. It has been reprinted for distribution to the Associates of the John Carter Brown Library.

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DOMESTIC needs of the Franklin household may well have been the inspiration for the Pennsylvania Fire-Place. It was probably during the winter of 1739–1740 that Benjamin Franklin sent his model for it to Robert Grace's Warwick Forge in Chester County to be cast in iron. During that same winter Franklin moved his family and business into a new home four doors down Market Street from where he had first established himself eleven years before. By 1740 he was well on his way to becoming Philadelphia's leading tradesman. *Poor Richard*, *an Almanac* and *The Pennsylvania Gazette* were read regularly by his fellow townsmen, and he was already printer to and clerk of the assembly as well as the postmaster of Philadelphia. His new house would be the center of much activity. The importance of his home has been described by Carl Van Doren. "He had no daily journeys to and from work. He simply got up and came downstairs, to his press, his shop, his accounts, and, after 1737, his post office. His house was his plain castle, his study, his laboratory, and a place to stand while he moved the world." It takes little imagination to picture Franklin contemplating, perhaps with some wifely urging, a way in which his new home could be made more comfortable without increasing expenses. He was successful. Some years later he wrote, "My common room, I know, is made twice as warm as it used to be, with a quarter of the wood I formerly consumed there."

FRANKLIN'S innovation soon attracted attention. By the following winter he and Robert Grace advertised in *The Pennsylvania Gazette*, "TO BE SOLD at the Post-Office Philadelphia, The New Improved Fire-Places; Where any Person may see some of them that are now in Use, and have the Nature and Advantages of them explain'd." In 1744 the two men had decided to widen their market, so Franklin wrote and Grace paid for the printing of the pamphlet which is reproduced here. The engraved plate was drawn by Lewis Evans, a surveyor and draughtsman and close friend of the Franklins's. He was later to achieve fame as the leading American geographer and cartographer of his time as a result of *A Map of Pensilvania, New-Jersey, New-York, and the Three Delaware Counties*, 1749, and *A General Map of the Middle British Colonies, in America*, 1755. This plate may be his first piece to be engraved. The engraving was actually done in Boston, probably by James Turner. Agents for the Fire-Place were appointed in Boston, Newport, New York, and Yorktown. Copies of the pamphlet were also sent and at least one of the agents, James Parker of New York, gave them away to the purchasers. An immediate result of the publication was an offer from Governor George Thomas to give Franklin a patent on the stove in Pennsylvania. He ". . . declined it from a Principle which has ever weigh'd with me on such Occasions, viz. *That as we enjoy great Advantages from the Invention of others, we should be glad of an Opportunity to serve others by any Invention of ours, and this we should do freely and generously*."

NEWS of the new invention soon spread across the Atlantic. Franklin wrote his friend William Strahan in London about it. Two years later Peter Collinson, to whom Franklin was to address his *Experiments and Observations on Electricity*, wrote asking for two copies of the pamphlet. Cadwallader Colden of New York forwarded his copy to Professor Johann F. Gronovius of Leyden, who replied, ". . . I could not hinder to let it be translated into Dutch, and no doubt soon into French." Although we have not yet been able to locate a copy of a Dutch translation, an index of books printed in Holland by Johannes van Abkoude, *Naamregister van de bekendst en meest in gebruck zynde nederduitsche boeken*, Rotterdam, 1778, lists *Beschrijving van de nieuw uitgebonden Pensilvanische Schoorsteenen*, Leiden, 1746.

No French translation has been identified but there were four Italian editions, in 1775, 1778, 1788, and 1791. Peter Kalm, the Swedish naturalist, also carried the news of Franklin's invention to Europe. He came to America in 1748 and spent three years travelling, observing, and talking to the leading figures of each of the colonies he visited. He recorded his conversations and observations in a journal that was the basis of three volumes published in Swedish in Stockholm, 1753–1761, which were followed by German, English, and Dutch translations, 1754–1764, 1770, and 1772. Kalm's discussions with Franklin about the Fire-Place, which occupy a prominent place in the book, have an important association with the John Carter Brown Library copy of *An Account of the New Invented Pennsylvania Fire-Places*, the one used for this reproduction. It bears Kalm's monogram and an inscription stating that it is the one given to him by Franklin. Later Kalm confused the issue by stating that it was Lewis Evans who gave it to him.

AN *Account of the New Invented Pennsylvania Fire-Places* occupies a major place in any Franklin collection. It reveals, for the first time, the many facets of Franklin's character. We see him as a practical man of business, as an inventor benefiting mankind, as an author, printer, and publisher, all facets of the personality of this remarkable and complex man which later Americans were to glorify. It is a comparatively scarce book, which has appeared in the auction market only nine times in the past century, the last time a quarter of a century ago. That twenty-one or so copies are known to have survived indicates its long-standing popularity among collectors.

THE fate of the Pennsylvania Fire-Place is perhaps best described by the editors of the *Papers of Benjamin Franklin*: "Later manufacturers of the so-called Franklin stove' have usually eliminated [the] air box, thereby abandoning a centrally important feature as the inventor conceived it; most 'Franklin stoves' made within the last hundred years . . . are little more than metal fireplaces. No example of an original Pennsylvania Fire-Place is known by the editors to survive, although a modern replica is to be seen at the Franklin Institute."

Thomas R. Adams
The John Carter Brown Library
Brown University

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AN
ACCOUNT
Of the NEW INVENTED
PENNSYLVANIAN
FIRE-PLACES:

WHEREIN

Their CONSTRUCTION and MANNER OF OPERATION is particularly explained;

Their ADVANTAGES above every other METHOD of WARMING ROOMS demonſtrated;

And all OBJECTIONS that have been raiſed againſt the USE OF THEM, anſwered and obviated.

With DIRECTIONS for putting them up, and for USING them to the beſt Advantage. And a COPPER-PLATE, in which the ſeveral PARTS of the MACHINE are exactly laid down, from a Scale of equal Parts.

PHILADELPHIA:
Printed and Sold by B. FRANKLIN. 1744.

ADVERTISEMENT.

THESE FIRE-PLACES are made in the beſt Manner, and ſold by *R. Grace* in *Philadelphia.* They are ſold alſo by *J. Parker* in *New-York*, and by *J. Franklin* in *Boſton.*

The within-deſcrib'd is of the middle and moſt common Size: There are others to be had both larger and ſmaller.

* * *

ERRATA. *Page* 9. *line* 6, of the Notes, read *Sanitate. line* 20, read *motus. Page* 14, *line* 21, after the Word *away*, add, *alſo a ſquare Hole* b *for the Bellows.*

AN ACCOUNT Of the NEW-INVENTED FIRE-PLACES.

IN theſe Northern Colonies the Inhabitants keep FIRES to ſit by, generally *Seven Months* in the Year; that is, from the Beginning of *October* to the End of *April*; and in ſome Winters near *Eight Months*, by taking in part of *September* and *May*.

WOOD, our common Fewel, which within theſe 100 Years might be had at every Man's Door, muſt now be fetch'd near 100 Miles to ſome Towns, and makes a very conſiderable Article in the Expence of Families.

As therefore ſo much of the Comfort and Conveniency of our Lives, for ſo great a Part of the Year, depends on the Article of FIRE; —ſince Fuel is become ſo expenſive, and (as the Country is more clear'd and ſettled) will of courſe grow ſcarcer and dearer; any new Propoſal for Saving the Wood, and for leſſening the Charge and augmenting the Benefit of FIRE, by ſome particular Method of Making and Managing it, may at leaſt be thought worth Conſideration.

THE NEW FIRE-PLACES are a late Invention to that purpoſe (experienced now three Winters by a great Number of Families in *Pennſylvania*) of which this Paper is intended to give a particular Account.

THAT the Reader may the better judge whether this Method of Managing Fire has any Advantage over thoſe heretofore in Uſe, it may be proper to conſider both the old and new Methods ſeparately and particularly, and afterwards make the Compariſon.

IN order to this, 'tis neceſſary to underſtand well ſome few of the Properties of AIR and FIRE, *viz.*

1. AIR is rarified by *Heat*, and condens'd by *Cold*; *i. e.* the ſame Quantity of Air takes up more Space when warm than when cold. This may be ſhown by ſeveral very eaſy Experiments. Take any clear Glaſs Bottle (a *Florence* Flaſk

ſtript of the Straw is beſt) place it before the Fire, and as the Air within is warm'd and rarified, part of it will be driven out of the Bottle; turn it up, place its Mouth in a Veſſel of Water, and remove it from the Fire; then, as the Air within cools and contracts, you will ſee the Water riſe in the Neck of the Bottle, ſupplying the Place of juſt ſo much Air as was driven out. Hold a large hot Coal near the Side of the Bottle, and as the Air within feels the Heat, it will again diſtend and force out the Water.——Or, Fill a Bladder half-full of Air, tie the Neck tight, and lay it before a Fire as near as may be without ſcorching the Bladder; as the Air within heats, you will perceive it to ſwell and fill the Bladder, till it becomes tight as if full-blown: Remove it to a cool Place, and you will ſee it fall gradually, till it become as lank as at firſt.

2. AIR rarified and diſtended by Heat, is *ſpecifically lighter than it was before, and will riſe in other Air of greater Denſity. As Wood, Oil, or any other Matter ſpecifically lighter than Water, if plac'd at the Bottom of a Veſſel of Water, will riſe till it comes to the Top; ſo rarified Air will riſe in common Air, till it either comes to Air of equal Weight, or is by Cold reduc'd to its former Denſity.

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* Body or Matter of any ſort is ſaid to be *ſpecifically* heavier or lighter than other Matter, when it has more or leſs Subſtance or Weight in the ſame Dimenſions.

A FIRE then being made in any Chimney, the Air over the Fire is rarified by the Heat, becomes lighter and therefore immediately riſes in the Funnel and goes out; the other Air in the Room (flowing towards the Chimney) ſupplies its Place, is rarified in its turn, and riſes likewiſe; the Place of the Air thus carried out of the Room is ſupplied by freſh Air coming in thro' Doors and Windows, or, if they be ſhut, thro' every Crevice with Violence, as may be ſeen by holding a Candle to a Key-hole: If the Room be ſo tight as that all the Crevices together will not ſupply ſo much Air as is continually carried off, then in a little time the Current up the Funnel muſt flag, and the Smoke being no longer driven up muſt come into the Room.

1. FIRE* throws out Light, Heat, and Smoke (or Fume) The two firſt move in right Lines and with great Swiftneſs; the latter is but juſt ſeparated from the Fuel, and then moves only as it is carried by the Stream of rarified Air. And without a continual Acceſſion and Receſſion of Air to carry off the Smoaky Fumes, they would remain crouded about the Fire, and ſtifle it.

2. HEAT may be ſeparated from the Smoke as well as from the Light, by means of a Plate of Iron, which will ſuffer Heat to paſs through it without the others.

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*i. e. Common Fire.

3. Fire ſends out its Rays of Heat, as well as Rays of Light, equally every way: But the greateſt ſenſible Heat is over the Fire, where there is, beſides the Rays of Heat ſhot upwards, a continual riſing Stream of hot Air, heated by the Rays ſhot round on every Side.

These Things being underſtood, we proceed to conſider the Fire-places heretofore in Uſe, *viz.*

1. The large open Fire-places uſed in the Days of our Fathers, and ſtill generally in the Country, and in Kitchens.

2. The newer-faſhion'd Fire-places, with low Breaſts, and narrow Hearths.

3. Fire-places with hollow Backs, Hearths and Jams of Iron, (deſcribed by Monſ. *Gauger**) for warming the Air as it comes into the Room.

4. The *Holland* Stoves, with Iron Doors opening into the Room.

5. The *German* Stoves, which have no Opening in the Room where they are us'd, but the Fire is put in from ſome other Room, or from without.

6. Iron Pots, with open Charcoal Fires, plac'd in the middle of a Room.

1. The firſt of theſe Methods has generally the Conveniency of two warm Seats, one in each Corner; but they are ſometimes too hot

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* In his Tract entitled, *La Mechanique de Feu.*

to abide in, and at other times incommoded with the Smoke; there is likewiſe good Room for the Cook to move, to hang on Pots, *&c.*—— Their Inconveniencies are, that they almoſt always ſmoke if the Door be not left open; that they require a large Funnel, and a large Funnel carries off a great Quantity of Air, which occaſions what is called a ſtrong Draft to the Chimney; without which ſtrong Draft the Smoke would come out of ſome Part or other of ſo large an Opening, ſo that the Door can ſeldom be ſhut; and the cold Air ſo nips the Backs and Heels of thoſe that ſit before the Fire, that they have no Comfort, 'till either Screens or Settles are provided (at a conſiderable Expence) to keep it off, which both cumber the Room and darken the Fire-ſide. A moderate Quantity of Wood on the Fire in ſo large a Hearth, ſeems but little; and, in ſo ſtrong and cold a Draught, warms but little; ſo that People are continually laying on more. In ſhort, 'tis next to impoſſible to warm a Room with ſuch a Fire-place: And I ſuppoſe our Anceſtors never thought of warming Rooms to ſit in; all they purpos'd was to have a Place to make a Fire in, by which they might warm themſelves when acold.

2. MOST of theſe old-faſhion'd Chimneys in Towns and Cities, have been, of late Years, reduc'd to the ſecond Sort mention'd, by building Jambs within them, narrowing the Hearth, and making a low Arch or Breaſt. 'Tis ſtrange, methinks, that tho' Chimneys have been ſo long

in Uſe, their Conſtruction ſhould be ſo little underſtood till lately, that no Workman pretended to make one which ſhould always carry off all the Smoke, but a Chimney-cloth was look'd upon as eſſential to a Chimney: This Improvement, however, by ſmall Openings and low Breaſts, has been made in our Days; and Succeſs in the firſt Experiments has brought it into general Uſe in Cities, ſo that almoſt all new Chimneys are now made of that ſort, and much fewer Bricks will make a Stack of Chimneys now than formerly. An Improvement ſo lately made, may give us Room to believe that ſtill farther Improvements may be found, to remedy the Inconveniencies yet remaining. For theſe new Chimneys, tho' they keep Rooms generally free from Smoke, and, the Opening being contracted, will allow the Door to be ſhut, yet the Funnel ſtill requiring a conſiderable Quantity of Air, it ruſhes in at every Crevice ſo ſtrongly, as to make a continual Whiſtling or Howling; and 'tis very uncomfortable as well as dangerous to ſit againſt any ſuch Crevice. Many Colds are caught from this Cauſe only; it being ſafer to ſit in the open Street; for then the Pores do all cloſe together, and the Air does not ſtrike ſo ſharply againſt any particular Part. The *Spaniards* have a Proverbial Saying, *If the Wind blows on you thro' a Hole, Make your Will, and take Care of your Soul.* Women, particularly, from this Cauſe, (as they ſit much in the Houſe) get Colds in the Head, Rheums and Defluctions, which fall into their Jaws and Gums, and have deſtroy'd ſtroy'd early many a fine Set of Teeth in theſe Northern Colonies. Great and bright Fires do alſo very much contribute to damage the Eyes, dry and ſhrivel the Skin, and bring on early the Appearances of Old-Age. In ſhort, many of the Diſeaſes proceeding from Colds, as Fevers, Pleuriſies, *&c.* fatal to very great Numbers of People, may be aſcrib'd to ſtrong-drawing Chimneys, whereby, in ſevere Weather, a Man is ſcorch'd before, while he's froze behind[†].

In

[†] As the Writer is neither Phyſician nor Philoſopher, the Reader may expect he ſhould juſtify theſe his Opinions by the Authority of ſome that are ſo. *M. Clare*, F.R.S. in his Treatiſe of *The Motion of Fluids*, ſays, page 246, *&c.* *And here it may be remarked, that 'tis more prejudicial to Health, to ſit near a Window or Door, in a Room where there are many Candles and a Fire, than in a Room without: For the Conſumption of Air thereby occaſioned, will always be very conſiderable, and this muſt neceſſarily be replaced by cold Air from without. Down the Chimney can enter none, the Stream of warm Air, always riſing therein, abſolutely forbids it: The Supply muſt therefore come in wherever other Openings ſhall be found. If theſe happen to be ſmall,* Let thoſe who ſit near them beware: *The ſmaller the Flood-gate, the ſmarter will be the Stream.* --- *Was a Man, even in a Sweat, to leap into a cold Bath, or jump from his warm Bed in the intenſeſt Cold, even in a Froſt, provided he do not continue over-long therein, and be in Health when he does this, we ſee by Experience that he gets no Harm. If he ſits a little while againſt a Window, into which a ſucceſſive Current of cold Air comes, his Pores are cloſed, and he gets a Fever. In the firſt Caſe, the Shock the Body endures is general, uniform, and therefore leſs fierce; in the other a ſingle Part, a Neck or Ear perchance, is attacked, and that with the greater Violence probably, as it is done by a ſucceſſive Stream of cold Air. And the Cannon of a Battery, pointed againſt a ſingle Part of a Baſtion, eaſier make a Breach, than were they directed to play ſingly*

on

In the mean time very little is done by theſe Chimneys towards warming the Room; for the Air round the Fire-place which is warm'd by the direct Rays from the Fire, does not continue in the Room, but is continually crouded and gather'd into the Chimney by the Current of cold Air coming behind it, and ſo is preſently carried off.

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upon the whole Face, and will admit the Enemy much ſooner into the Town.

That warm Rooms, and keeping the Body warm in Winter, are Means of preventing ſuch Diſeaſes, take the Opinion of that learned *Italian* Phyſician, *Antonio Portio*, in the Preface to his Tract *de Militis Sanitate tuenda*, where, ſpeaking of a particular wet and cold Winter, remarkable at *Venice* for its Sicklineſs, he ſays, "Popularis autem pleuritis quæ Venetiis ſæviit menſibus Dec. Jan. Feb. ex coeli, aeriſq; inclementia facta eſt, quod non habeant hypocauſta [*Stove-Rooms*] & quod non ſoliciti ſunt Itali omnes de auribus, temporibus, collo, totoq; corpore defendendis ab injuriis aëris; & tegmina domorum Veneti diſponant parum inclinata, ut nives diutius permaneant ſuper tegmina. E contra, Germani, qui experiuntur coeli inclementiam, perdidicere ſeſe defendere ab aëris injuria. Tecta conſtruunt multum inclinata, ut decidant nives. Germani abundant lignis, domuſq; *hypocauſtis*; foris autem incedunt pannis, pellibus, goſſipio, bene mehercule loricati atq; muniti. In Bavaria interrogabam (curioſitate motu~~m~~s videndi Germaniam) quot nam elapſis menſibus pleuritide vel peripneumonia fuiſſent abſumti; dicebant vix unus aut alter illis temporibus pleuritide fuit correptus."

The great Dr. *Boerhaave*, whoſe Authority alone might be ſufficient, in his Aphoriſms mentions, as one antecedent Cauſe of Pleuriſies, *a cold Air driven violently through ſome narrow Paſſage upon the Body overheated by Labour or Fire.*

The *Eaſtern* Phyſicians agree with the *Europeans* in this Point; witneſs the *Chineſe* Treatiſe, entitled *Tchang ſeng*, i. e. *The Art of procuring Health and long Life*, as tranſlated

In both theſe Sorts of Fire-places, the greateſt Part of the Heat from the Fire is loſt: For as Fire naturally darts Heat every way, the Back, the two Jambs, and the Hearth, drink up almoſt all that's given them, very little being reflected from Bodies ſo dark, porous and unpoliſh'd; and the upright Heat, which is by far the greateſt, flies directly up the Chimney. Thus Five Sixths at leaſt of the Heat (and conſequently of the Fewel) is waſted, and contributes nothing towards warming the Room.

3. To remedy this, the Sieur *Gauger* gives us, in his Book entitled, *La Mechanique de Feu*, publiſhed 1709, ſeven different Conſtructions of the third Sort of Chimneys mentioned above, in which there are hollow Cavities made by Iron Plates in the Back, Jambs and Hearth, thro' which Plates the Heat paſſing, warms the Air in thoſe Cavities, which is continually coming into the Room freſh and warm. The Invention was very ingenious, and had many Conveniencies: The Room was warm'd in all Parts, by the Air flowing into it through the

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in *Pere Du Halde*'s Account of *China*, which has this Paſſage. *As of all the Paſſions which ruffle us, Anger does the moſt Miſchief; ſo of all the malignant Affections of the Air, a* Wind that comes thro' any narrow Paſſage, *which is cold and piercing, is* moſt dangerous; *and coming upon us unawares, inſinuates itſelf into the Body, often cauſing grievous Diſeaſes. It ſhould therefore be avoided, according to the Advice of the ancient Proverb, as carefully as the Point of an Arrow.* Theſe Miſchiefs are avoided by the Uſe of the new-invented Fire-places, as will be ſhewn hereafter.

heated Cavities: Cold Air was prevented ruſhing thro' the Crevices, the Funnel being ſufficiently ſupply'd by thoſe Cavities: Much leſs Fuel would ſerve, *&c.* But the firſt Expence, which was very great; the Intricacy of the Deſign, and the Difficulty of the Execution, eſpecially in old Chimneys, diſcouraged the Propagation of the Invention; ſo that there are (I ſuppoſe) very few ſuch Chimneys now in Uſe. [The upright Heat, too, was almoſt all loſt in theſe, as in the common Chimneys.]

4. The *Holland* Iron Stove, which has a Flue proceeding from the Top, and a ſmall Iron Door opening into the Room, comes next to be conſidered. Its Conveniences are, that it makes a Room all over warm; for the Chimney being wholly cloſed, except the Flue of the Stove, very little Air is required to ſupply that, and therefore not much ruſhes in at Crevices, or at the Door when 'tis opened. Little Fewel ſerves, the Heat being almoſt all ſaved; for it rays out almoſt equally from the four Sides, the Bottom and the Top, into the Room, and preſently warms the Air around it, which being rarified riſes to the Cieling, and its Place is ſupplied by the lower Air of the Room, which flows gradually towards the Stove, and is there warm'd and riſes in its Turn, ſo that there is a continual Circulation till all the Air in the Room is warmed. The Air, too, is gradually changed by the Stove-Door's being in the Room, thro' which, part of it is continually paſſing, and that makes theſe Stoves wholeſomer, or at leaſt

pleaſanter, than the *German* Stoves next to be ſpoke of. —— But they have theſe Inconveniences. There is no Sight of the Fire, which is in itſelf a pleaſant Thing. One cannot conveniently make any other Uſe of the Fire but that of warming the Room. When the Room is warm, People not ſeeing the Fire are apt to forget ſupplying it with Fuel 'til 'tis almoſt out, then, growing cold, a great deal of Wood is put in, which ſoon makes it too hot. The Change of Air is not carried on quite quick enough, ſo that if any Smoke or ill Smell happens in the Room, 'tis a long Time before 'tis diſcharg'd. For theſe Reaſons the *Holland* Stove has not obtain'd much among the *Engliſh* (who love the Sight of the Fire) unleſs in ſome Workſhops, where People are oblig'd to ſit near Windows for the Light, and in ſuch Places they have been found of good Uſe.

5. The *German* Stove is like a Box, one Side wanting. 'Tis compos'd of Five Iron Plates ſcru'd together; and fix'd ſo as that you may put the Fuel into it from another Room, or from the Outſide of the Houſe. 'Tis a kind of Oven revers'd, its Mouth being without, and Body within the Room that is to be warm'd by it. This Invention certainly warms a Room very ſpeedily and thoroughly with little Fuel: No Quantity of cold Air comes in at any Crevice, becauſe there is no Diſcharge of Air which it might ſupply, there being no Paſſage into the Stove from the Room. Theſe are its Conveniencies. — Its Inconveniences are, That Peo-

ple have not even ſo much Sight or Uſe of the Fire as in the *Holland* Stoves, and are moreover oblig'd to breathe the ſame unchang'd Air continually, mix'd with the Breath and Perſpiration from one anothers Bodies, which is very diſagreeable to thoſe who have not been accuſtomed to it.

6. Charcoal Fires, in Pots, are us'd chiefly in the Shops of Handicraftsmen. They warm a Room (that is kept cloſe and has no Chimney to carry off the warm'd Air) very ſpeedily and uniformly: But there being no Draught to change the Air, the ſulphurous Fumes from the Coals [be they ever ſo well kindled before they are brought in, there will be ſome] mix with it, render it diſagreeable, hurtful to ſome Conſtitutions, and ſometimes, when the Door is long kept ſhut, produce fatal Conſequences.

To avoid the ſeveral Inconveniences, and at the ſame time retain all the Advantages of other Fire-places, was contrived the PENNSYLVANIA FIRE-PLACE now to be deſcribed.

This Machine conſiſts of
A Bottom Plate, (i) [*See the Cut.*]
A Back Plate, (ii)
Two Side Plates, (iii iii)
Two Middle Plates, (iv iv) which join'd together form a tight Box with winding Paſſages in it for warming the Air.
A Front Plate, (v)
A Top Plate, (vi)

Theſe are all of caſt Iron, with Mouldings or Ledges where the Plates come together, to hold them faſt, and retain the Mortar us'd for Pointing to make tight Joints. When the Plates are all in their Places, a Pair of ſlender Rods with Screws, are ſufficient to bind the Whole very firmly together, as it appears in *Fig*. 2.

There are, moreover, two thin Plates of wrought Iron, *viz*. The Shutter, (vii) and the Regiſter, (viii) ; beſides the Screw-Rods O P, all which we ſhall explain in their Order.

(i) The Bottom Plate, or Hearth-Piece, is round before, with a riſing Moulding that ſerves as a Fender to keep Coals and Aſhes from coming to the Floor, *&c*. It has two Ears, *F G*, perforated to receive the Screw-Rods *O P* ; a long Air-hole, *a a*, thro' which the freſh outward Air paſſes up into the Air-Box ; and three Smoke-Holes *B C* thro' which the Smoke deſcends and paſſes away†; all repreſented by dark Squares. It has alſo double Ledges to receive between them the Bottom Edges of the Back-Plate, the two Side Plates, and the two middle Plates. Theſe Ledges are about an Inch aſunder, and half an Inch high ; a Profile of two of them join'd to a Fragment of Plate appears in *Fig*. 3.

(ii) The Back Plate is without Holes, having only a Pair of Ledges on each Side, to receive the Back Edges of the two

(iii iii) Side Plates : Theſe have each a Pair of Ledges to receive the Side-Edges of the Front Plate, and a little Shoulder for it to reſt on; alſo two Pair of Ledges to receive the Side-Edges of the two Middle Plates which form the Air-Box; and an oblong Air-hole near the Top, thro' which is diſcharg'd into the Room the Air warm'd in the Air-Box. Each has alſo a Wing or Bracket, *H* and *I*, to keep in falling Brands, Coals, *&c.* and a ſmall Hole *Q* and *R*, for the Axis of the Regiſter to turn in.

(iv iv) The Air-Box is compos'd of the two Middle Plates *D E* and *F G*. The firſt has five thin Ledges or Partitions, caſt on it, two Inches deep, the Edges of which are receiv'd in ſo many Pair of Ledges caſt in the other. The Tops of all the Cavities form'd by theſe thin deep Ledges are alſo covered by a Ledge of the ſame Form and Depth, caſt with them; ſo that when the Plates are put together, and the Joints luted, there is no Communication between the Air-Box and the Smoke. In the winding Paſſages of this Box, freſh Air is warm'd as it paſſes into the Room.#

(v) The Front Plate is arch'd on the under Side, and ornamented with Foliages, *&c.* it has no Ledges.

(vi) The Top Plate has a Pair of Ears *M N*, anſwerable to thoſe in the Bottom Plate, and perforated for the ſame Purpoſe: It has alſo a Pair of Ledges running round the under Side, to receive the Top-Edges of the Front, Back and Side Plates. The Air-Box does not reach up to the Top Plate by two Inches and half.

(vii) The Shutter is of thin wrought Iron and light, of ſuch a Length and Breadth as to cloſe well the Opening of the Fire-Place. It is us'd to blow up the Fire, and to ſhut up and ſecure it a Nights. It has two braſs Knobs for Handles *d d*, and commonly ſlides up and down in a Groove, left, in putting up the Fire-place, between the foremoſt Ledge of the Side Plates, and the Face of the Front Plate; but ſome chooſe to ſet it aſide when it is not in Uſe, and apply it on Occaſion.

(viii) The Regiſter, is alſo of thin wrought Iron. It is plac'd between the Back Plate and Air-Box, and can, by Means of the Key *S* be turn'd on its Axis ſo as to lie in any Poſition between level and upright.

The Screw-Rods *O P* are of wrought Iron, about a third of an Inch thick, with a Button at Bottom, and a Screw and Nut at Top; and may be ornamented with two ſmall Braſſes ſcrew'd on above the Nuts.

To put this Machine to work,

1. A falſe Back of four Inch- (or, in ſhallow ſmall Chimneys, two Inch-) Brick-work is to be made in the Chimney, ~~four~~ six Inches or more from the true Back: From the Top of this falſe Back, a Cloſing is to be made over to the Breaſt of the Chimney, that no Air may paſs into the Chimney, but what goes under the falſe Back, and up behind it.

2. Some Bricks of the Hearth are to be taken up, to form a Hollow under the Bottom Plate; acroſs which Hollow runs a thin tight Partition to keep apart the Air entring the Hollow, and the Smoke; and is therefore plac'd between the Air-hole and Smoke-holes.

3. A Paſſage is made, communicating with the outward Air, to introduce that Air into the forepart of the Hollow under the Bottom Plate, whence it may riſe thro' the Air-hole into the Air-box.

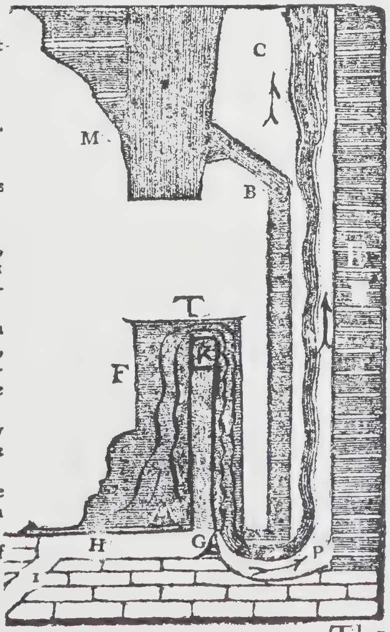
4. A Paſſage is made from the back Part of the Hollow, communicating with the Flue behind the falſe Back: Through this Paſſage the Smoke is to paſs.

The Fire-place is to be erected upon theſe Hollows, by putting all the Plates in their Places, and ſcrewing them together.

Its Operation may be conceiv'd by obſerving the following

PROFILE of the Chimney and FIRE-PLACE.

M The Mantle-piece or Breaſt of the Chimney.
C The Funnel.
B The falſe Back & Cloſing.
E True Back of the Chimney.
T Top of the Fire-place.
F The Front of it.
A The Place where the Fire is made.
D The Air-Box.
K The Hole in the Side-plate, thro' which the warm'd Air is diſcharg'd out of the Air-Box into the Room.
H The Hollow fill'd with freſh Air, entring at the Paſſage *I*, and aſcending into the Air-Box thro' the Air-hole in the Bottom-plate near
G The Partition in the Hollow to keep the Air and Smoke apart.
P The Paſſage under the falſe Back and Part of the Hearth for the Smoke.
↑↑↑↑↑↑ The Courſe of the Smoke.



The Fire being made at *A*, the Flame and Smoke will aſcend and ſtrike the Top *T*, which will thereby receive a conſiderable Heat. The Smoke finding no Paſſage upwards, turns over the Top of the Air-box, and deſcends between it and the Back Plate to the Holes at *B* in the Bottom Plate, heating, as it paſſes, both Plates of the Air-box and the ſaid Back Plate; the Front Plate, Bottom and Side Plates are alſo all heated at the ſame Time. The Smoke proceeds in the Paſſage that leads it under and behind the falſe Back, and ſo riſes into the Chimney. The Air of the Room, warm'd behind the Back Plate, and by the Sides, Front and Top Plates, becoming ſpecifically lighter than the other Air in the Room, is oblig'd to riſe; but the Cloſure over the Fire-place hindring it from going up the Chimney, it is forc'd out into the Room, riſes by the Mantle-piece to the Cieling and ſpreads all over the Top of the Room, whence being crouded down gradually by the Stream of newly warm'd Air that follows and riſes above it, the whole Room becomes in a ſhort time equally warmed.

At the ſame Time the Air, warmed under the Bottom Plate and in the Air-Box, riſes, and comes out of the Holes in the Side-Plates, very ſwiftly if the Door of the Room be ſhut, and joins its Current with the Stream before mentioned riſing from the Side, Back and Top Plates.

The Air that enters the Room thro' the Air-box is freſh, tho' warm; and computing the Swiftneſs of its Motion with the Areas of the

Holes, 'tis found that near 10 Barrels of freſh Air are hourly introduc'd by the Air-Box; and by this Means the Air in the Room is continually changed, and kept at the ſame Time ſweet and warm.

'Tis to be obſerved that the entring Air will not be warm at firſt Lighting the Fire, but heats gradually as the Fire encreaſes.

A ſquare Opening for a Trap-Door ſhould be left in the Cloſing of the Chimney, for the Sweeper to go up: The Door may be made of Slate or Tin, and commonly kept cloſe ſhut, but ſo plac'd as that turning up againſt the Back of the Chimney when open, it cloſes the Vacancy behind the falſe Back, and ſhoots the Soot that falls in Sweeping, out upon the Hearth. This Trap-Door is a very convenient Thing.

In Rooms where much Smoking of Tobacco is uſed, 'tis alſo convenient to have a ſmall Hole about five or ſix Inches ſquare, cut near the Cieling through into the Funnel: This Hole muſt have a Shutter, by which it may be clos'd or open'd at Pleaſure. When open, there will be a ſtrong Draught of Air through it into the Chimney, which will preſently carry off a Cloud of Smoke, and keep the Room clear: If the Room be too hot likewiſe, it will carry off as much of the warm Air as you pleaſe, and then you may ſtop it intirely, or in part, as you think fit. By this Means it is that the Tobacco-Smoke does not deſcend among the Heads of the Company near the Fire, as it muſt do before it can get into common Chimneys.

The Manner of Uſing this FIREPLACE.

YOUR Cord-wood muſt be cut into three Lengths; or elſe a ſhort Piece, fit for the Fire-place, cut off, and the longer left for the Kitchin or other Fires. Dry Hickery, or Aſh, or any Woods that burn with a clear Flame, are rather to be choſen; becauſe ſuch are leſs apt to foul the Smoke-Paſſages with Soot; and Flame communicates, with its Light, as well as by Contact, greater Heat to the Plates and Room. But where more ordinary Wood is uſed, half a dry Faggot of Bruſh-wood burnt at the firſt making of Fire in the Morning, is very advantageous; as it immediately by its ſudden Blaze heats the Plates and warms the Room (which with bad Wood ſlowly kindling would not be done ſo ſoon) and at the ſame time, by the Length of its Flame turning in the Paſſages, conſumes and cleanſes away the Soot that ſuch bad ſmoaky Wood had produc'd therein the preceding Day, and ſo keeps them always free and clean. — When you have laid a little Back-log, and plac'd your Billets on ſmall Dogs, as in common Chimneys, and put ſome Fire to them; then ſlide down your Shutter as low as the Dogs, and the Opening being by that Means contracted, the Air ruſhes in briſkly and preſently blows up the Flames. When the Fire is ſufficiently kindled, ſlide it up again*. In ſome of theſe Fire-places there is a little ſix-inch ſquare Trap-door of thin wrought Iron or Braſs, covering a Hole of like Dimenſions near the Fore-part of the Bottom-Plate, which being by a Ring lifted up towards the Fire, about an Inch, where it will be retain'd by two ſpringing Sides fix'd to it perpendicularly, [*See the Plate, Fig.* 4] the Air ruſhes in from the Hollow under the Bottom Plate, and blows the Fire. Where this is us'd, the Shutter ſerves only to cloſe the Fire a Nights. — The more forward you can make your Fire on the Hearth-Plate, not to be incommoded by the Smoke, the ſooner and more will the Room be warmed. —— At Night when you go to Bed, cover the Coals or Brands with Aſhes as uſual; then take away the Dogs and ſlide down the Shutter cloſe to the Bottom-Plate, ſweeping a little Aſhes againſt it that no Air may paſs under it; then turn the Regiſter, ſo as very near to ſtop the Flue behind. If no Smoke then comes out at Crevices into the Room, 'tis right: If any Smoke is perceiv'd to come out, move the Regiſter ſo as to give a little Draught, and 'twill go the right way. — Thus the Room will be kept warm all Night; for the Chimney being almoſt entirely ſtopt, very

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* The Shutter is ſlid up and down in this Manner, only in thoſe Fire-places which are ſo made, as that the Diſtance

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tance between the Top of the arch'd Opening and the Bottom Plate, is the ſame as the Diſtance between it and the Top-Plate. Where the Arch is higher, as it is in the Draught annex'd, which is agreeable to the laſt Improvements) the Shutter is ſet by, and apply'd occaſionally: becauſe if it were made deep enough to cloſe the whole Opening when ſlid down, it would hide Part of it when up.

little, if any, cold Air will enter the Room at any Crevice. When you come to re-kindle the Fire in the Morning, turn open the Regiſter before you lift up the Slider, otherwiſe if there be any Smoke in the Fire-Place, it will come out into the Room. By the ſame Uſe of the Shutter and Regiſter, a blazing Fire may be preſently ſtifled, as well as ſecured, when you have Occaſion to leave it for any Time; and and at your Return, you will find the Brands warm and ready for a ſpeedy Re-kindling. The Shutter alone will not ſtifle a Fire; for it cannot well be made to fit ſo exactly, but that Air will enter, and that in a violent Stream, ſo as to blow up and keep alive the Flames, and conſume the Wood, if the Draught be not check'd by turning the Regiſter to ſhut the Flue behind. — The Regiſter has alſo two other Uſes, If you obſerve the Draught of Air into your Fire-place, to be ſtronger than is neceſſary, (as in extream cold Weather it often is) ſo that the Wood is conſum'd faſter than uſual; in that Caſe, a quarter, half, or two thirds Turn of the Regiſter, will check the Violence of the Draught, and let your Fire burn with the Moderation you deſire: And at the ſame Time both the Fire-Place and the Room will be the warmer, becauſe leſs cold Air will enter and paſs through them. —— And if the Chimney ſhould happen to take Fire (which indeed there is very little Danger of, if the preceding Direction be obſerv'd in making Fires, and it be well ſwept once a Year; for, much leſs Wood being burnt, leſs Soot is proportionably made;

and the Fuel being ſoon blown into Flame by the Shutter (or the Trap-door Bellows) there is conſequently leſs Smoke from the Fuel to make Soot; then, tho' the Funnel ſhould be foul, yet the Sparks have ſuch a crooked up and down round-about Way to go, that they are out before they get at it) I ſay, if it ſhould ever be on fire, a Turn of the Regiſter ſhuts all cloſe, and prevents any Air going into the Chimney, and ſo the Fire may be eaſily ſtifled and maſtered.

The Advantages of this FIRE-PLACE.

ITS Advantages above the common Fire-Places are,

1. That your whole Room is equally warmed; ſo that People need not croud ſo cloſe round the Fire, but may ſit near the Window and have the Benefit of the Light for Reading, Writing, Needle-work, *&c.* They may ſit with Comfort in any Part of the Room; which is a very conſiderable Advantage in a large Family, where there muſt often be two Fires kept, becauſe all cannot conveniently come at One.

2. If you ſit near the Fire, you have not that cold Draught of uncomfortable Air nipping your Back and Heels, as when before common Fires, by which many catch Cold, being ſcorcht before and as it were froze behind.

3. If you ſit againſt a Crevice, there is not that ſharp Draught of cold Air playing on you, as in Rooms where there are Fires in the com-

mon way ; by which many catch Cold, whence proceed Coughs, * Catarrhs, Tooth-Achs, Fevers, Pleuriſies and many other Diſeaſes.

4. In Caſe of Sickneſs, they make moſt excellent Nurſing-Rooms ; as they conſtantly ſupply a Sufficiency of freſh Air, ſo warmed at the ſame time as to be no way inconvenient or dangerous. A ſmall One does well in a Chamber ; and, the Chimneys being fitted for it, it may be remov'd from one Room to another as Occaſion requires, and fix'd in half an Hour. The equal Temper, too, and Warmth, of the Air of the Room, is thought to be particularly advantageous in ſome Diſtempers : For 'twas obſerv'd in the Winters of 1730 and 1736, when the Small-Pox ſpread in *Pennſylvania*, that very few of the Children of the *Germans* died of that Diſtemper, in Proportion to thoſe of the *Engliſh* ; which was aſcrib'd by ſome to the Warmth and equal Temper of Air in their Stove-Rooms ; which made the Diſeaſe as favourable as it commonly is in the *Weſt-Indies*. But this Conjecture we ſubmit to the Judgment of Phyſicians.

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* My Lord *Moleſworth*, in his Account of *Denmark*, ſays, That " few or none of the People there, are troubled
" with Coughs, Catarrhs, Conſumptions, or ſuch like
" Diſeaſes of the Lungs ; ſo that in the Midſt of Winter
" in the Churches, which are very much frequented,
" there is no Noiſe to interrupt the Attention due to the
" Preacher. I am perſuaded (ſays he) their *warm Stoves* con-
" tribute to their Freedom from theſe kind of Maladies".
Page 91.

5. In common Chimneys the ſtrongeſt Heat from the Fire, which is upwards, goes directly up the Chimney, and is loſt; and there is ſuch a ſtrong Draught into the Chimney, that not only the upright Heat, but alſo the back, ſides and downward Heats, are carried up the Chimney by that Draught of Air; and the Warmth given before the Fire by the Rays that ſtrike out towards the Room, is continually driven back, crouded into the Chimney, and carried up, by the ſame Draught of Air.—But here the upright Heat, ſtrikes and heats the Top Plate, which warms the Air above it, and that comes into the Room. The Heat likewiſe which the Fire communicates to the Sides, Back Bottom and Air-Box, is all brought into the Room; for you will find a conſtant Current of warm Air coming out of the Chimney-Corner into the Room. Hold a Candle juſt under the Mantle-Piece or Breaſt of your Chimney, and you will ſee the Flame bent outwards: By laying a Piece of ſmoaking Paper on the Hearth, on either Side, you may ſee how the Current of Air moves, and where it tends, for it will turn and carry the Smoke with it.

6. Thus as very little of the Heat is loſt, when this Fire-Place is us'd, *much leſs Wood** will ſerve you, which is a conſiderable Advantage where Wood is dear.

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* People who have us'd theſe Fire-places, differ much in their Accounts of the Wood ſaved by them. Some ſay five ſixths, others three fourths, and others much leſs. This is owing to the great Difference there was in their former Fires; ſome (according to the different Circum-

7. When you burn Candles near this Fire-Place, you will find that the Flame burns quite upright, and does not blare and run the Tallow down, by drawing towards the Chimney, as againſt common Fires.

8. This Fire-place cures moſt ſmoaky Chimneys, and thereby preſerves both the Eyes and Furniture.

9. It prevents the Fouling of Chimneys; much of the Lint and Duſt that contributes to foul a Chimney, being by the low Arch oblig'd to paſs thro' the Flame, where 'tis conſum'd. Then, leſs Wood being burnt, there is leſs Smoke made. Again, the Shutter, or Trap-Bellows, ſoon blowing the Wood into a Flame, the ſame Wood does not yield ſo much Smoke as if burnt in a common Chimney: For as ſoon as Flame begins, Smoke, in proportion, ceaſes.

10. And if a Chimney ſhould be foul, 'tis much leſs likely to take Fire. If it ſhould take Fire, 'tis eaſily ſtifled and extinguiſhed.

11. A Fire may be very ſpeedily made in this Fire-Place, by the Help of the Shutter, or Trap-Bellows, as aforeſaid.

12. A Fire may be ſoon extinguiſhed, by cloſing it with the Shutter before, and turning

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ſtances of their Rooms and Chimneys) having been us'd to make very large, others middling, and others, of a more ſparing Temper, very ſmall Ones: While in theſe Fire-Places, (their Size and Draught being nearly the ſame) the Conſumption is more equal. I ſuppoſe, taking a Number of Families together, that two thirds, or half the Wood at leaſt, is ſaved. My common Room, I know, is made twice as warm as it uſed to be, with a quarter of the Wood I formerly conſum'd there.

the Regiſter behind, which will ſtifle it, and the Brands will remain ready to rekindle.

13. The Room being once warm, the Warmth may be retain'd in it all Night.

14. And laſtly, the Fire is ſo ſecur'd at Night, that not one Spark can fly out into the Room to do Damage.

With all theſe Conveniencies, you do not loſe the pleaſant Sight nor Uſe of the Fire, as in the Dutch Stoves, but may boil the Tea-Kettle, warm the Flat-Irons, heat Heaters, keep warm a Diſh of Victuals by ſetting it on the Top, *&c. &c. &c.*

Objections anſwered.

THERE are ſome Objections commonly made by People that are unacquainted with theſe Fire-Places, which it may not be amiſs to endeavour to remove, as they ariſe from Prejudices which might otherwiſe obſtruct in ſome Degree the general Uſe of this beneficial Machine. We frequently hear it ſaid, *They are of the Nature of the Dutch Stoves; Stoves have an unpleaſant Smell; Stoves are unwholeſome;* and, *Warm Rooms make People tender and apt to catch Cold.*—As to the firſt, that they are of the Nature of *Dutch* Stoves, the Deſcription of thoſe Stoves in the Beginning of this Paper, compar'd with that of theſe Machines, ſhows that there is a moſt material Difference, and that theſe have vaſtly the Advantage, if it were only in the ſingle Article of the Admiſſion and Circulation of freſh Air. But it muſt be allowed there has been ſome Cauſe to complain of the offenſive Smell of Iron Stoves. This Smell, however, never proceeded from the Iron itſelf, which in its Nature, whether hot or cold, is one of the ſweeteſt of Metals, but from the general uncleanly Manner of uſing thoſe Stoves. If they are kept clean, they are as ſweet as an Ironing-Box, which, tho' ever ſo hot, never offends the Smell of the niceſt Lady: But it is common, to let them be greaſed by ſetting Candleſticks on them, or otherwiſe; to rub greaſy Hands on them, and, above all, to ſpit upon them to try how hot they are, which is an inconſiderate, filthy unmannerly Cuſtom; for the ſlimy Matter of Spittle drying on, burns and fumes when the Stove is hot, as well as the Greaſe, and ſmells moſt nauſeouſly; which makes ſuch cloſe Stove-Rooms, where there is no Draught to carry off thoſe filthy Vapours, almoſt intolerable to thoſe that are not from their Infancy accuſtomed to them. At the ſame time, nothing is more eaſy than to keep them clean; for when by any Accident they happen to be fouled, a Lee made of Aſhes and Water, with a Bruſh, will ſcour them perfectly; as will alſo a little ſtrong Soft-Soap and Water.

That hot Iron of itſelf gives no offenſive Smell, thoſe know very well, who have (as the Writer of this has) been preſent at a Furnace, when the Workmen were pouring out the flowing Metal to caſt large Plates, and not the leaſt Smell of it to be perceived. That hot Iron does not, like Lead, Braſs, and ſome other Metals, give out unwholeſome Vapours, is plain from the general Health and Strength of thoſe who conſtantly work in Iron, as Furnace-men, Forge-Men, and Smiths; That it is in its Nature a Metal perfectly wholeſome to the Body of Man, is known from the beneficial Uſe of Chalybeat or Iron-Mine Waters; from the Good done by taking Steel Filings in ſeveral Diſorders; and that even the Smithy Water in which hot Irons are quench'd, is found advantageous to the human Conſtitution. — The ingenious and learned Dr. *Deſaguliers*, to whoſe inſtructive Writings the Contriver of this Machine acknowledges himſelf much indebted, relates an Experiment he made, to try whether heated Iron would yield unwholeſome Vapours; He took a Cube of Iron, and having given it a very great Heat, he fix'd it ſo to a Receiver, exhauſted by the Air Pump, that all the Air ruſhing in to fill the Receiver, ſhould firſt paſs thro' a Hole in the hot Iron. He then put a ſmall Bird into the Receiver, who breath'd that Air without any Inconvenience or ſuffering the leaſt Diſorder. But the ſame Experiment being made with a Cube of hot Braſs, a Bird put into that Air dy'd in a few Minutes. Braſs indeed ſtinks even when cold, and much more when hot; Lead too, when hot, yields a very unwholeſome Steam; but IRON is always ſweet, and every way taken is wholeſome and friendly to the human Body ——— except in Weapons.

That warm Rooms make People tender and apt to catch Cold, is a Miſtake as great as it is (among the *Engliſh*) general. We have ſeen in the preceding Pages how the common Rooms are apt to give Colds; but the Writer of this Paper may affirm, from his own Experience, and that of his Family and Friends who have uſed warm Rooms for theſe four Winters paſt, that by the Uſe of ſuch Rooms, People are rendered *leſs liable* to take Cold, and indeed *actually hardened*. If ſitting warm in a Room made One ſubject to take Cold on going out, lying warm in Bed ſhould, by a Parity of Reaſon, produce the ſame Effect when we riſe; Yet we find we can leap out of the warmeſt Bed naked in the coldeſt Morning, without any ſuch Danger; and in the ſame Manner out of warm Clothes into a cold Bed. The Reaſon is, that in theſe Caſes the Pores all cloſe at once, the Cold is ſhut out, and the Heat within augmented, as we ſoon after feel by the glowing of the Fleſh and Skin. Thus no one was ever known to catch Cold by the Uſe of the Cold Bath: And are not cold Baths allowed to harden the Bodies of thoſe that uſe them? Are they not therefore frequently preſcrib'd to the tendereſt Conſtitutions? Now every Time you go out of a warm Room into the cold freezing Air, you do as it were plunge into a Cold Bath, and the Effect is in proportion the ſame; for (tho' perhaps you may feel ſomewhat chilly at firſt) you find in a little Time your Bodies hardened and ſtrengthened, your Blood is driven round with a briſker Circulation, and a comfortable ſteady uniform inward Warmth ſucceeds that equal outward Warmth you firſt received in the Room. Farther to confirm this

Aſſertion, we inſtance the *Swedes*, the *Danes*, the *Ruſſians* : Theſe Nations are ſaid to live in Rooms, compar'd to ours, as hot as Ovens ;* yet where are the hardy Soldiers, tho' bred in their boaſted cool Houſes, that can, like theſe People, bear the Fatigues of a Winter Campaign in ſo ſevere a Climate, march whole Days to the Neck in Snow, and at Night entrench in Ice, as they do?

The Mentioning of thoſe Northern Nations puts me in Mind of a conſiderable *Publick Advantage* that may ariſe from the general Uſe of theſe Fire-places. It is obſervable, that tho' thoſe Countries have been well inhabited for many Ages, Wood is ſtill their Fuel, and yet at no very great Price ; which could not have been if they had not univerſally uſed Stoves, but conſum'd it as we do, in great Quantities by open Fires. By the Help of this ſaving Invention, our Wood may grow as faſt as we conſume it, and our Poſterity may warm themſelves at a moderate Rate, without being oblig'd to fetch their Fuel over the *Atlantick*; as, if Pit-Coal ſhould not be here diſcovered (which is an Uncertainty) they muſt neceſſarily do.

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* Mr. *Boyle*, in his Experiments and Obſervations upon
Cold, *Shaw's Abridgment*, *Vol.* I. *p.* 684, ſays, "'Tis remar-
" kable, that while the Cold has ſtrange and tragical Effects
" at *Moſcow*, and elſewhere, the *Ruſſians* and *Livonians*
" ſhould be exempt from them, who accuſtom themſelves
" to paſs immediately from a great Degree of Heat, to as
" great an one of Cold, without receiving any viſible
" Prejudice thereby. I remember, being told by a Per-
" ſon of unqueſtionable Credit, that it was a common
" Practice among them, to go from a hot Stove into cold
" Water ; the ſame was, alſo, affirmed to me, by ano-
" ther who reſided at *Moſcow* : This Tradition is likewiſe
" abundantly confirmed by *Olearius*. " *'Tis a ſurprizing*
" *thing*," ſays he, " *to ſee how far the Ruſſians can endure*
" *Heat ; and how, when it makes them ready to faint,*
" *they can go out of their Stoves, ſtark naked, both Men and*
" *Women, and throw themſelves into cold Water ; and even*
" *in Winter wallow in the Snow.*"

We leave it to the *Political Arithmetician* to compute, how much Money will be ſav'd to a Country, by its ſpending two thirds leſs of Fuel; how much Labour ſav'd in Cutting and Carriage of it; how much more Land may be clear'd for Cultivation; how great the Profit by the additional Quantity of Work done, in thoſe Trades particularly that do not exerciſe the Body ſo much, but that the Workfolks are oblig'd to run frequently to the Fire to warm themſelves: And to Phyſicians to ſay, how much healthier thick-built Towns and Cities will be, now half ſuffocated with ſulphury Smoke, when ſo much leſs of that Smoke ſhall be made, and the Air breath'd by the Inhabitants be conſequently ſo much purer. Theſe Things it will ſuffice juſt to have mentioned; let us proceed to give ſome neceſſary Directions to the Workman who is to fix or ſet up theſe Fire-Places.

Directions to the Bricklayer.

The Chimney being firſt well ſwept and cleans'd from Soot, *&c.* lay the Bottom Plate down on the Hearth in the Place where the Fire-Place is to ſtand, which may be as forward as the Hearth will allow. Chalk a Lin from one of its back Corners round the Plat to the other Corner, that you may afterwards know its Place when you come to fix it ; and from thoſe Corners two parallel Lines to the Back of the Chimney : Make Marks alſo on each Side, that you may know where the Partition is to ſtand, which is to prevent any Communication between the Air and Smoke. Then removing the Plate, make a Hollow under it and beyond it, by taking up as many of the Bricks or Tiles as you can within your chalk'd Lines, quite to the Chimney-Back. Dig out ſix or eight Inches deep of the Earth or Rubbiſh all the Breadth and Length of your Hollow ; then make a Paſſage of four Inches ſquare, (if the Place will allow ſo much) leading from the Hollow to ſome Place communicating with the outer Air ; by *outer Air* we mean Air without the Room you intend to warm. This Paſſage may be made to enter your Hollow on either Side, or in the Fore-part, juſt as you find moſt convenient, the Circumſtances of your Chimney conſidered. If the Fire-Place is to be put up in a Chamber, you may have this Communication of outer Air from the Staircaſe ; or ſometimes more eaſily from between the Chamber Floor and the Cieling of the lower Room, making only a ſmall Hole in the Wall of the Houſe entring the Space betwixt thoſe two Joiſts with which your Air-Paſſage in the Hearth communicates. If this Air-Paſſage be ſo ſituated, as that Mice may enter it and neſtle in the Hollow, a little Grate of

Wire will keep them out. This Paſſage being made, and, if it runs under any Part of the Hearth, til'd over ſecurely; you may proceed to raiſe your falſe Back. This may be of four Inches or two Inches Thickneſs, as you have ſix Room, but let it ſtand at leaſt ~~four~~ Iuches from the true Chimney-Back. In narrow Chimnies this falſe Back runs from Jamb to Jamb, but in large old-faſhion'd Chimnies you need not make it wider than the Back of the Fire-place. To begin it, you may form an Arch nearly flat of three Bricks End to End, over the Hollow, to leave a Paſſage the Breadth of the Iron Fire-Place, and 8 ~~five~~ or 10 ~~ſix~~ Inches deep, rounding at Bottom, for the Smoke to turn and paſs under the falſe Back, and ſo behind it up the Chimney. The falſe Back is to riſe till it is as high as the Breaſt of the Chimney, and then to cloſe over to the Breaſt;* always obſerving, if there is a wooden Mantle-Tree, to cloſe above it. If there is no Wood in the Breaſt, you may arch over and cloſe even with the lower Part of the Breaſt. By this Cloſing the Chimney is made tight, that no Air or Smoke can paſs up it, without going under the falſe Back. Then from Side to Side of your Hollow, againſt the Marks you made with Chalk, raiſe a tight Partition, Brick-on-Edge, to ſeparate the Air from the Smoke, bevelling away to half an Inch the Brick that comes juſt under the Air-Hole, that the Air may have a free Paſſage up into the

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* See *page* 19, where the Trap-door is deſcrib'd, that ought to be in this Cloſing.

Air-Box : Laſtly, cloſe the Hearth over that Part of the Hollow that is between the falſe Back and the Place of the Bottom Plate, coming about half an Inch under the Plate, which Piece of hollow Hearth may be ſupported by a Bit or two of old Iron Hoop ; then is your Chimney fitted to receive the Fire-Place.

To ſet it, Lay firſt a little Bed of Mortar all round the Edges of the Hollow and over the Top of the Partition : Then lay down your Bottom Plate in its Place (with the Rods in it) and tread it till it lies firm. Then put a little fine Mortar (made of Loam and Lime with a little Hair) into its Joints, and ſet in your back Plate, leaning it for the preſent againſt the falſe Back ; Then ſet in your Air-Box, with a little Mortar in its Joints ; Then put in the two Sides, cloſing them up againſt the Air-Box with Mortar in their Grooves, and fixing at the ſame time your Regiſter ; Then bring up your Back to its Place, with Mortar in its Grooves, and that will bind the Sides together. Then put in your Front-Plate, placing it as far back in the Groove as you can, to leave Room for the ſliding Plate ; Then lay on your Top-Plate, with Mortar in its Grooves alſo, ſcrewing the whole firmly together by means of the Rods. The Capital Letters *A B D E*, *&c.* in the annex'd Cut, ſhow the correſponding Parts of the ſeveral Plates. Laſtly the Joints being pointed all round on the Out-ſide, the Fire-Place is fit for Uſe.

When you make your firſt Fire in it, perhaps, if the Chimney be thoroughly cold, it may not draw, the Work too being all cold and damp. In ſuch Caſe put firſt a few Shovels of hot Coals in the Fire-Place, then lift up the Chimney-ſweeper's Trap-Door, and putting in a Sheet or two of flaming Paper, ſhut it again, which will ſet the Chimney a Drawing immediately, and when once 'tis fill'd with a Column of warm Air, it will draw ſtrongly and continually.

The Drying of the Mortar and Work by the firſt Fire, may ſmell unpleaſantly; but that will ſoon be over.

In ſome ſhallow Chimneys, to make more Room for the falſe Back and its Flue, four Inches or more of the Chimney-Back may be pick'd away.

Let the Room be made as tight as conveniently it may be, ſo will the outer Air that muſt come in to ſupply the Room and Draught of the Fire, be all obliged to enter thro' the Paſſage under the Bottom-Plate, and up thro' the Air-Box; by which Means it will not come cold to your Backs, but be warmed as it comes in, and mixed with the warm Air round the Fire-Place before it ſpreads in the Room.

But as a great Quantity of cold Air, in extream cold Weather eſpecially, will preſently enter a Room if the Door be careleſly left open, 'tis good to have ſome Contrivance to ſhut it, either by Means of Screw Hinges, a Spring, or a Pulley.

When the Pointing in the Joints is all dry and hard, get ſome Powder of Black-Lead, (broken Bits of Black-Lead Crucibles from the

Silver-ſmith's, pounded fine, will do) and mixing it with a little Rum and Water, lay it on, when the Plates are warm, with a hard Bruſh, over the Top and Front-Plates, part of the Side and Bottom Plates, and over all the Pointing; and as it dries rub it to a Gloſs with the ſame Bruſh, ſo the Joints will not be diſcern'd, but it will look all of a Piece, and ſhine like new Iron. And the falſe Back being plaiſter'd and white-waſh'd, and the Hearth redden'd, the whole will make a pretty Appearance. Before the Black Lead is laid on, it would not be amiſs to waſh the Plates with ſtrong Lee and a Bruſh, or Soap and Water, to cleanſe them from any Spots of Greaſe or Filth that may be on them. If any Greaſe ſhould afterwards come on them, a little wet Aſhes will get it out.

If it be well ſet up, and in a tolerable good Chimney, Smoke will draw in from as far as the Fore-Part of the Bottom Plate, as you may try by a Bit of burning Paper.

People are at firſt apt to make their Rooms too warm, not imagining how little a Fire will be ſufficient. When the Plates are no hotter than that one may juſt bear the Hand on them, the Room will generally be as warm as you deſire it.

THE END.

EXPLANATION of the PLATE,

Referring to the Pages where the ſeveral Parts are deſcrib'd, or their Uſes ſhewn.

		Page
i	*The Bottom Plate*	14
ii	*The Back Plate*	14
iii iii	*The two Side Plates*	14
iv iv	*The two Plates that make up the Air-Box*	15
v	*The Front Plate*	15
vi	*The Top Plate*	15
vii	*The Shutter or Slider*	15, 20, 21, 22
viii	*The Regiſter*	16, 21, 22
Fig 2.	*The Fire-Place put together*	16, 35
3.	*The Section of a Fragment of a Plate, ſhewing the quarter-round Regulets that make the Joints*	14
4.	*The Blower, (Bottom upwards)*	21
O P	*The two Screw Rods*	14
‡ ‡	*With the prick'd Lines, ſhew the Courſe of the Air thro' the Windings of the Air-Box.*	

The Capital Letters ſhow the correſponding Parts of the ſeveral Plates.

On the DEVICE of the NEW FIRE-PLACE,

A SUN; *with this Motto*, ALTER IDEM.

i.e. *A ſecond Self*; or, *Another, the ſame.*

By a Friend.

ANOTHER Sun! — 'tis true; — but not THE SAME.
Alike, I own, in Warmth and genial Flame:
But, more obliging than his elder Brother,
This will not ſcorch in Summer, like *the other*;
Nor, when ſharp *Boreas* chills our ſhiv'ring Limbs,
Will *this Sun* leave us for more Southern Climes;
Or, in long Winter Nights, forſake us here,
To chear new Friends in t'other Hemiſphere:
But, faithful ſtill to us, this *new Sun*'s Fire,
Warms when we pleaſe, and juſt as we deſire.

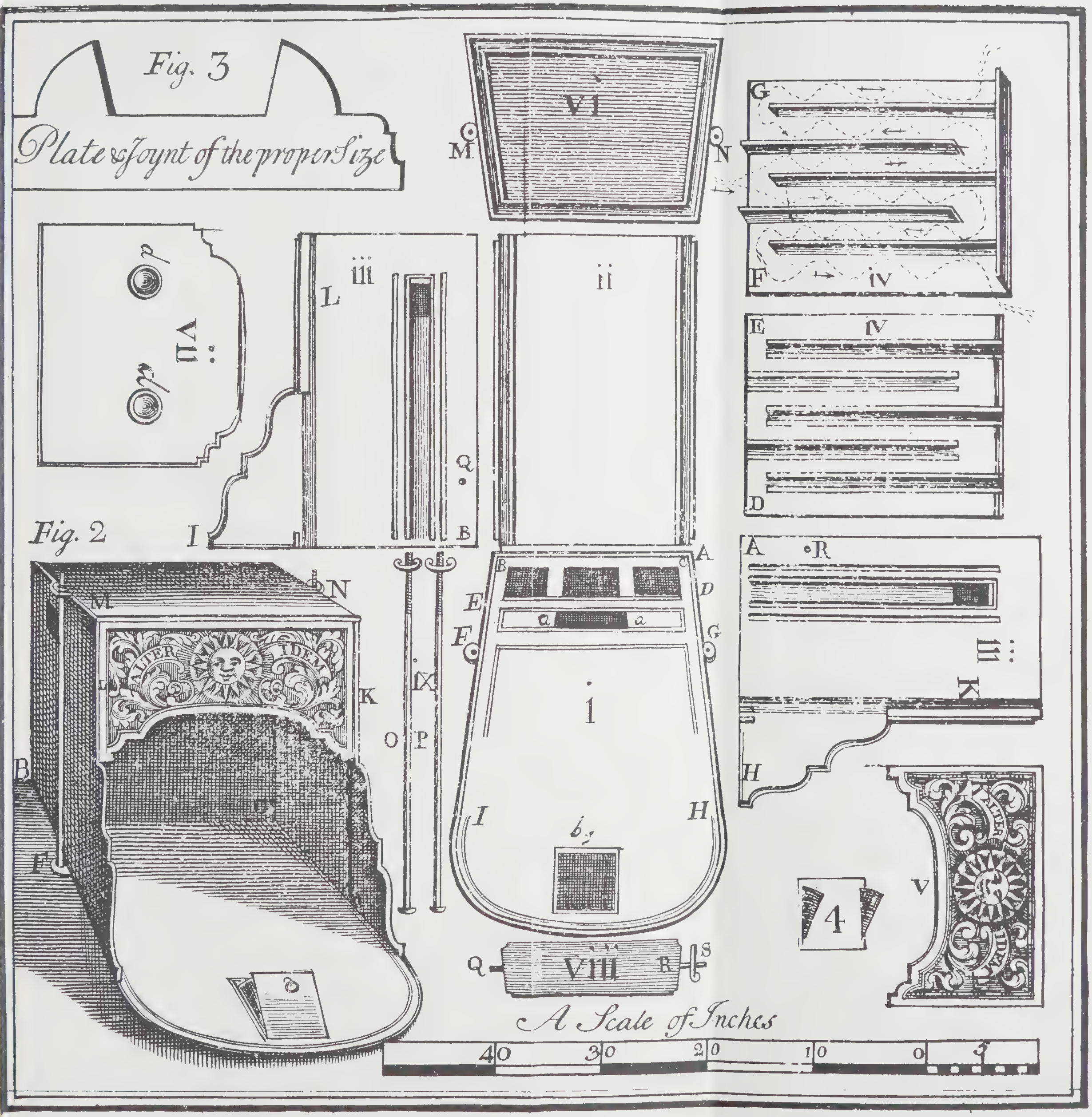
Fig. 3
Plate & Joynt of the proper Size
VII
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I
ii
VI
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N
G
F
iv
E
IV
D
Fig. 2
M
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ALTER
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A
R
iii
K
H
V
4
Q
VIII
R
S
A Scale of Inches
40
30
20
10
0
3

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